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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,115	08/01/2001	Wolfgang Hoenlein	32226.11	3454

7590 09/07/2006

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EXAMINER

RAETZSCH, ALVIN T

ART UNIT PAPER NUMBER

1754

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/919,115	Applicant(s) HOENLEIN ET AL.	
	Examiner Alvin T. Raetzsch	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Objections

1. Claim 46 is a duplicate claim (of claim 43). Applicant is required to cancel or amend the claim. Note that claim 48 is dependent on claim 46.

Claim Rejections

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. **Claims 36, 40-41, 43, 46, 49, & 51** are rejected under 35 U.S.C. 102(e) as anticipated by Fisher et al. (6,203,814).

Fisher teaches oxidizing MWNT (Column 3, lines 63-65) with strong acids (including nitric and sulfuric) and attaching them to a substrate with covalent bonds to functional groups of the substrate (Column 4, lines 6-10). The effects recited are deemed to occur due to the similarity of the explanation to specification pages 3 & 4.

3. **Claims 36, 38, 40-41, 43, 45-46, & 49-51** are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (1999 article).

Liu et al. teaches oxidizing carbon nanotubes and attaching them to a substrate coated with functional groups that bond covalently to the groups on the nanotubes. The oxidation is carried out with nitric acid (Experimental, line 3), with the nanotubes being separated from the mixture prior to bonding with the substrate. Silica, which is used as an electrical component, is taught as a substrate. Although Liu uses SWNT, MWNT would be an obvious alternative, as one of ordinary skill at the time of the invention would know that MWNT are more resilient to destruction by oxidation and additionally are cheaper to produce.

4. **Claims 37, 39, 44, 47-48, & 52-53** are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. as applied to claims 36, 40, & 46 above, and further in view of Cohen et al. (6,231,980), or the applicant's disclosure.

Liu does not teach doping the carbon nanotubes with boron and nitrogen. Cohen, however, teaches said doping and teaches improved electrical and mechanical

properties that are gained by boron nitride doping. It would have been obvious to one of ordinary skill at the time of the invention to dope MWNT and attach them to a silica substrate as taught by Liu in order to harness the properties taught by Cohen.

Additionally, the applicant states that doping with boron nitride was known in the art (Page 1 of specification).

5. **Claim 42** is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. as applied to claim 40 above, and further in view of Smalley et al. (US 2002/0136683).

Liu teaches oxidizing and purifying with nitric acid, but does not mention using sulfuric acid with peroxide. Smalley teaches that nitric acid and mixtures of sulfuric acid with peroxide are analogous alternatives for nanotube oxidation and purification (paragraph [0096]).

Response to Arguments


6. Applicant's arguments with respect to claims 36-53 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alvin T. Raetzsch whose telephone number is 571-272-8164. The examiner can normally be reached on 9-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ATR 



STUART L. HENDRICKSON
PRIMARY EXAMINER